REMARKS

Further and favorable reconsideration is respectfully requested in view of the amendments and remarks set forth in the response of August 15, 2007, as well as the foregoing amendments and additional remarks set forth below.

Claim 1 has been amended to limit the steel to consist essentially of the components recited in the claim. Claim 5 has been rewritten in independent format, and claims 22-24 have been amended, in order to be consistent with the amendments to claim 1. No new matter has been added to the application by these amendments.

In view of the amendments discussed above, Applicants' recited steel is limited to the specified materials and those that do not materially affect the basic and novel characteristics of the claimed invention. See MPEP 2111.03 and *In re Hertz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976).

This amendment is particularly relevant to the Hill et al. reference. Specifically, as discussed in the first full paragraph on page 14 of Applicants' previous response, the steel of Hill et al. accepts contents of Co, Ta and W, which are not present in Applicants' recited steel. Specifically, in column 1, lines 54-57, Hill et al. state that cobalt is an essential constituent of the invention. Further, in column 2 of the reference, it is stated that the broad composition range of the steels of the invention include 0.2 – 7 weight percent cobalt, 0-0.25 weight percent tantalum and 0-0.75 weight percent tungsten. The inclusion of these elements does materially affect the basic and novel characteristics of Applicants' claimed invention for the following reasons.

Generally speaking, Co, Ta and W, if significantly present, would modify the phase transformation diagrams discussed in the prior response and below, and these changes would lead to a risk that the 100% bainite structure recited in Applicants' claims would not be obtained in the defined conditions of the claimed invention.

Also, Co strongly reduces the hardenability of steels, and would have a detrimental influence on the mechanical characteristics of the claimed steels. As stated in Hill et al. (see column 8, lines 51-55), Co increases the martensitic transformation temperature Ms. Thus, there would be a high risk of obtaining martensite in addition to the bainite, if Co was significantly present in the steel of the claimed invention.

Concerning Ta, this very costly element is easily oxidized, and that would form within Applicants recited steel coarse non-metallic inclusions like Ta_2O_5 within

Applicants' recited steel, which would be detrimental to the high inclusion cleanness of Applicants' claimed invention. This would strongly downgrade the tensile properties and the machinability, as well as the fatigue properties, all features which are important for Applicants' claimed invention.

Concerning W, it forms coarse and very hard carbides during solidification, which are detrimental to mechanical properties, fatigue behavior and machinability. These carbides would then be very difficult to dissolve within the austenite, even at the heating temperatures required before forging. Even if dissolved, they may precipitate again in the austenite during cooling, with the same detrimental consequences as cited above. Also, W favors formation of perlite, since it creates spindles of cementite $(Fe, W)_xC_y$, and would lead to structures not containing 100% bainite.

Also enclosed herewith are Documents 2 – 4. Document 2 is a table prepared by Applicants, which demonstrates that the ultimate tensile strength (UTS) of the steels of Hill et al. are very high, nearly always much higher than 1300 MPa (1 ksi = 6.89 MPa), while Applicants' invention aims at an Rm (= UTS) between 1000 and 1300 MPa, as recited in independent claims 1 and 5. Please review the remarks set forth beginning on the third full paragraph on page 14 of the prior response to the first paragraph on page 15 of the prior response.

Document 3 compares the process routes according to Hill et al. to the process of Applicants' invention in the case where a fully (or "substantially" for Hill et al.) bainitic structure is desired. Please review the remarks set forth beginning in the first full paragraph on page 15 of the prior response to the fifth paragraph on page 15 of the prior response.

Document 4 is a comparison of process routes according to JP '246 and the process of Applicants' invention. As demonstrated by this comparison, the process of JP '246 is completely different from Applicants' process. Please review the remarks set forth in the second to last paragraph on page 20 of the prior response.

The above attachments and remarks are intended to further distinguish Applicant's invention from the cited prior art.

Therefore, in view of the amendments and remarks set forth in the response of August 15, 2007, and the foregoing amendments and remarks, it is submitted that each of

the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

Pierre DIERICKX et al.

By: _____

Amy E. Schmid
Registration No. 55,965
Attorney for Applicants

AES/nrj
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
August 27, 2007

DOCUMENT (2)

Patent Re. 28,523 : Ultimate Tensile Strength of steels a to u of Table 1 according to results of Tables 2, 3 , 4 and 4A (Columns 17,18,19 and 20)

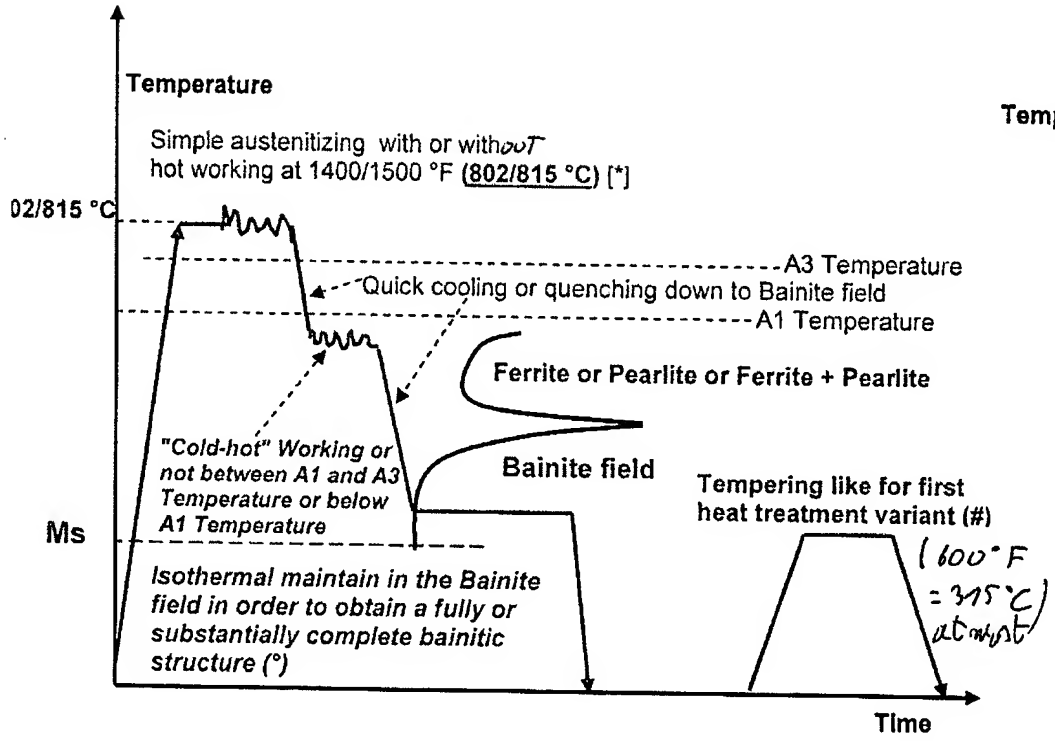
Steel N°	Table 2 : Steels quenched (to obtain Martensite) from 1450/1600 °F (788/871 °C) and tempered at 400 °F (204 °C)		Table 3 : Steels quenched (to obtain Martensite) from 1450/ 1600 °F (788/871 °C) and tempered at 600 °F (315 °C)		Table 4 : Steels austenitized at 1450 to 1750 °F (788 to 944 °C), then deformed between 1150 and 1750 °F (621 and 944 °C then quenched (to obtain Martensite) and at last tempered between 250 to 600 °F (121 to 315 °C)		Table 4A : Steels austenitized at 1450 °F (788°C), quenched to 500 °F (260 °C) and maintained at this temperature as long to obtain a full Bainite transformation. After passage to room temperature, tempered 1 hour at 500°F (260°C) (*)	
	UTS obtained		UTS obtained		UTS obtained		UTS obtained	
	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
a	230	1584	220	1516	220 – 251 – 239 - 250	1516 – 1729 – 1647 – 1722	-	-
b	290	1998	250	1722	298 – 390 – 380 – 325 340	2053 – 2687 – 2618 – 2239 2342	270 - 320	1860 - 2205
c	330	2273	280	1929	450 – 410 – 360 – 420	3100 – 2825 – 2480 - 2894	-	-
d	195	1343	180	991	-	-	-	-
e	335	2308	270	1531	-	-	-	-
f	280	1929	260	1791	-	-	-	-
g	290	1998	270	1860	-	-	-	-
h	230	1584	210	1447	-	-	-	-
i	320	2205	275	1895	-	-	-	-
j	330	2273	325	2239	430 – 390	2963 - 2687	-	-
k	240	1653	230	1584	-	-	-	-
l	295	2032	260	1751	-	-	-	-
m	290	1998	260	1791	-	-	-	-
n	310	2136	260	1791	-	-	-	-
o	295	2032	270	1531	-	-	-	-
p	292	2012	260	1791	-	-	-	-
q	290	1998	300	2067	-	-	-	-
r	-	-	-	-	340 – 380 – 295 - 330	2342 – 2618 – 2032 – 2274	-	-
s	-	-	-	-	360 – 305 – 290 – 400 360 – 330 – 390 – 323 308	2480 – 2101 – 1998 – 2756 2480 – 2274 – 2687 – 2225 2122	-	-
t	-	-	-	-	336 – 333	2315 – 2294	-	-
u	-	-	-	-	435 – 450 - 375	2997 – 3100 - 2584	-	-

(*) See US Patent Re. 28,523, column 16, lines 16 to 26, column 19 lines 65 to 68 and column 20, lines 36 to 41

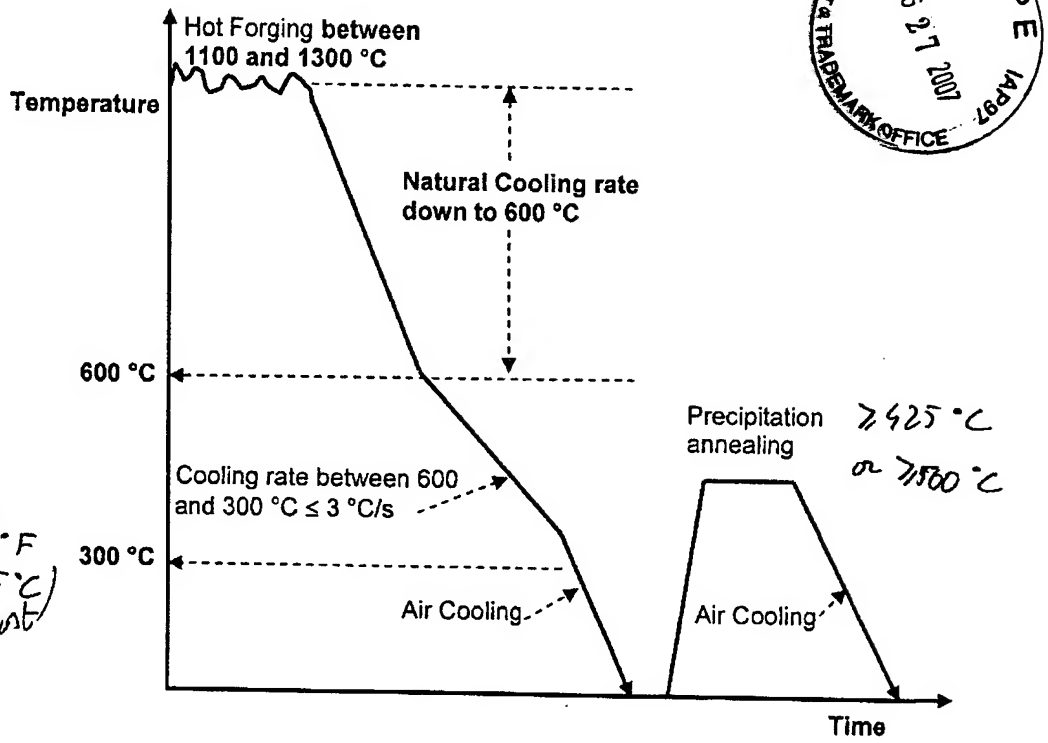
DOCUMENT (3)

5th type/variant of heat treatment of US patent Re. 28,523 : Comparison of Process routes according to US' 28,253 and present invention for the case where a fully (or "substantially" for Patent Re. 28,253) bainitic structure is aimed (°)

Process route according to US Re. 28,523



Process route according to present invention



[*] and (°) See US Patent Re. 28,523, column 16, lines 16 to 26, Footnotes * * of Tables 7 and 8 indicating temperatures of the isothermal maintaining in the bainite field (lines 7 to 10 of column 25) and times and temperatures of the isothermal maintaining in the Bainite field in Figure 6 of US'523 Patent, that is maintain of 3 or 6 hours at the indicated temperatures and column 19, lines 65 to 68 and column 20, lines 36 to 41

(#)1 or 2 times

DOCUMENT (4)

Comparison of Process routes according to JP'152246 and present invention